RESOURCES

Internet of Supply Chains: Digitalizing the Pharmaceutical Supply Network



Executive Summary

The pharma industry leads many other industry sectors in pioneering adoption of the Internet of Supply Chains (IoSC), a new integration model that links people, processes, systems, and enterprises.

The resulting “network of networks” that provides connections and data sharing for traceability has expanded to enable data-driven visibility and interoperability among all supply chain partners across the full life history of a product, from plan to source to make to deliver. Many lessons can be learned from this early work:

- Leverage the investments made in track and trace network infrastructure to drive digitalization across your trading network.
- Digital connections with trading partners bring advanced transparency and collaboration.
- The TraceLink “integrate once and interoperate with everyone” model makes it easy and inexpensive to connect to all your trading partners.
- The IoSC is the largest pharma industry network that enables both data sharing and semantic understanding across the industry.
- Collective intelligence gleaned from an integrated network of networks provides incredible insights to predict drug shortages, anticipate supply

© TraceLink Inc. 2009 - 2025 All Rights Reserved

disruptions, and respond quickly to changes in demand.

- Digital transformation can be achieved through a crawl, walk, run approach.

The COVID-19 era has provided a master class in the many things that could undermine supply chain reliability. Widespread labor outages related to lockdowns and illness. Shortages of critical parts, raw materials and packaging materials. Delivery delays from ocean freight and trucking challenges. Unanticipated surge in demand for certain products and severe weather events. Everything that could have gone wrong did, and exposed weak links in the supply chain across all industry sectors.

“Pharma supply chain management will be one of the earliest beneficiaries of Industry 4.0 and the vast potential that is possible when a ‘network of networks’ can be created to allow for broader interoperability among companies." - Shabbir Dahod, President & CEO, TraceLink

In September 2022, a panel of experts sat down at the North American Supply Chain Executive Summit (NASCES) in Chicago to share their thoughts on what’s needed to help companies navigate this chaotic supply chain environment. The Internet of Supply Chains (IoSC) was a common thread, playing a critical part in the overall goal of achieving Industry 4.0. The IoSC links together supply chain partners into an ecosystem that enables robust communication, collaboration, and orchestration of shared workflows across multiple enterprises. Organizations, their suppliers, and their suppliers’ suppliers, gain precision visibility into the flow of materials and processes because they are connected by interoperable networks that link companies, people, processes, and systems around common business purposes. When supply chain partners are able to operate as though they are part of a single, digitally integrated enterprise based on a common data model, the payoff is demonstrable.

© TraceLink Inc. 2009 - 2025 All Rights Reserved

Looking back, looking ahead

“When the pandemic first hit, it was a stark wakeup call and the biggest issue most companies had was that all of the plans they had in place had to be thrown out because all of the demand signals were suddenly different from what they had expected,” says Shabbir Dahod, President and CEO of TraceLink. But when it comes to patient safety and access to lifesaving medications, there is little tolerance for delivery or manufacturing delays. Companies across the pharmaceutical, life sciences, and healthcare industries have had no choice but to pivot in a meaningful way—and that means the implementation of state-of-the-art processes that would deliver improved outcomes.

“Companies need to become flexible and build resilience,” says Rita Fisher, EVP, Supply Chain and Chief Information Officer for Reynolds Consumer Products. However, she notes that simply adding more suppliers to buffer the risk—a widely used strategy—is not the answer. “Having second- and third-tier suppliers is no longer enough because they will all go force majeure at some point,” she explained.

Instead, the industry-wide events of recent years have underscored the need for a more robust overall infrastructure. This is only achieved through widespread digitalization, which enables improved end-to-end visibility and transparency among all the interconnected companies in any given supply chain.

Specifically, strategic digitalization that uses a proven technology platform based on a common data language and an “integrate once, interoperate with everyone” model gives manufacturers improved connectivity with their supply chain partners. This seamless integration provides access to real-time data and crucial visibility into the day-to-day operations of both:

1. Upstream suppliers (to identify and predict critical issues and shortages that will impact manufacturing), contract manufacturing partners, kitting companies, and third-party logistics and distribution that support the business.

© TraceLink Inc. 2009 - 2025 All Rights Reserved

2. Downstream customers to ensure real-time visibility into shipments, product availability and inventory, sales and fluctuating demand signals, all of which would impact production planning and delivery/distribution scheduling.

While companies throughout the healthcare, pharmaceutical, and life sciences sectors have certainly experienced their share of supply chain disruptions, many operators in this space are already ahead of the curve. This is in large part due to the rigorous unit-level track-and-trace and serialization requirements of the U.S. Drug Supply Chain Security Act (DSCSA) going into effect in November 2023. Many enterprises in this space have already made strategic investments in recent years to improve data exchange and interoperability with their partners.

Such investments (and the related experience) provide an important technology backbone and conceptual foundation that can be leveraged to enable even broader digitalization. This digital transformation will play a critical role in overcoming supply chain issues and enabling data-driven optimization of manufacturing, supply planning, and distribution and transportation planning.

Industry 4.0 and the Internet of Supply Chains (IoSC)

Industry 4.0 is an overarching concept that envisions the boundless opportunities that are possible when computerized systems—such as enterprise resource planning (ERP) and supply chain management (SCM) systems—can be connected more broadly. Existing and expanded networks can then be integrated seamlessly with other networks using a common data model, enabling manufacturers to make data-driven decisions and carry out modeling and trend analysis. With this data easily accessible, companies in the pharma industry can make predictions to improve overall supply chain agility and responsiveness.

“Pharma supply chain management will be one of the earliest beneficiaries of Industry 4.0 and the vast potential that is possible when a ‘network of networks’ can be created to allow for broader interoperability among companies,” says Dahod of TraceLink. “The resulting ‘network of networks’ improves machine-to-

© TraceLink Inc. 2009 - 2025 All Rights Reserved

machine communications and provides access to broader and deeper data from supply chain partners, which can be analyzed and modeled using intelligence (AI) and machine learning (ML) techniques."

The payoff from such efforts is real, driving improvements to demand planning and manufacturing scheduling, on top of reducing cycle times, supply chain disruptions and cost of goods, according to Dahod.

When companies are able to gain broader access to real-time data signals from their supply chain partners and customers, they are able to predict and avoid supply disruptions, carry out data-driven demand planning, and improve both short-term response and long-term planning. As the number of companies participating in a centralized technology platform continues to grow, so does the collective intelligence and breadth and depth of real time data that is needed to help companies predict and prevent shortages of both critical parts and finished products, anticipate supply disruptions and identify shifts in demand with enough time to enable proactive intervention and reduce risk.

"Unfortunately, there is still a lot of resistance among people who have been around for a while, and the price and burden of bringing in a new system often adds to the resistance," notes George Llado, former SVP and Chief Information Officer for Alexion Pharmaceuticals (Retired).

"There's a lot of heavy lifting to do, but you can start today to identify opportunities to re-engineer the flow to better support your customers and patients, and to prioritize what you can take on today," adds Jake Barr, CEO of BlueWorld Supply Chain Consulting.

Nonetheless, companies that are behind in the preparation curve should not feel daunted. "It's okay for companies to crawl and then walk and then run," Barr added. "You can think and start small as long as you address the three key pillars—process, technology and organization/people."

© TraceLink Inc. 2009 - 2025 All Rights Reserved

“Digitalization is not simply about the automation of information that is passed from one supplier or trading partner into your organization,” Barr continues. “It’s about integrating that information into the other supporting processes, generating scenarios and predictive curves about the potential implications that are going to arise and being able to use the insights and stay ahead of the curve…and it means you must come up with a plan to grab all of the external partner data that fuels the business.”

Such end-to-end connectivity enables deeper and richer collective intelligence and allows stakeholders to use advanced analytics capabilities based on machine learning (ML) and artificial intelligence (AI) on not just the data available within a single company but on data from all of their integrated supply chain partners and customers. “Such capabilities allow us to predict drug shortages before they occur, based on vast amounts of real-time data,” says Dahod of Tracelink. Importantly, he notes that companies “only need to integrate once into the network and then benefit from this collective platform for collective execution end to end basis.”

Want more insight? Watch the full replay below:

Learn more about the Internet of Supply Chains

Expert Bios

The pannel discussion that took place in September 2022 at NASCES in Chicago featured:



© TraceLink Inc. 2009 - 2025 All Rights Reserved

Shabbir Dahod

Shabbir Dahod is President and Chief Executive Officer of TraceLink and a member of the company's Board of Directors. He co-founded the company in 2009 with a vision of building a business that transforms how companies manage the manufacturing, packaging, distribution, and dispensing of pharmaceutical products in the global life sciences supply chain.



George Llado, Alexion Pharmaceuticals (Retired)

George Llado was formerly Senior Vice President and Chief Information Officer of Alexion Pharmaceuticals. He was responsible for building the company's Global Information Technology function, which enables Alexion to serve patients with rare diseases through the innovation, development, and commercialization of life-changing therapies.



Jake Barr, BlueWorld Supply Chain Consulting

Jake Barr is CEO for BlueWorld Supply Chain Consulting, providing support to a cross section of Fortune 500 companies like Colgate, Merck, Bayer/Monsanto, Pfizer, and Sanofi. Barr is engaged in public health sector work with the Bill &

© TraceLink Inc. 2009 - 2025 All Rights Reserved

Melinda Gates Foundation.



Rita Fisher, Reynolds Consumer Products

Rita is EVP, Supply Chain and Chief Information Officer for Reynolds Consumer Products (RCP). As a member of the RCP Lead team, Fisher is responsible for all aspects of the company’s Supply Chain and Information Technology, including strategies, policies, programs and business transformations leading to improved financial results and new customer experiences.

VideoSupply Chain Digitalization
Contact us to learn more about the Internet of Supply Chains

Thank you for contacting us; we’ll be in touch shortly.

Related Content

© TraceLink Inc. 2009 - 2025 All Rights Reserved



The Internet of Supply Chains: Your Fast Path to Digital Transformation

The Internet of Supply Chains (IoSC) is a powerful extension of current efforts to digitally transform the extremely manual and cumbersome process of communicating with partners through electronic data interchange (EDI), email, phone calls, and spreadsheets.
View More

© TraceLink Inc. 2009 - 2025 All Rights Reserved



Connecting the Pharmaceutical Industry Through the Internet of Supply Chains

Imagine—a single network integration that enables any network member to link systems, people, and processes with any other network member across the entire industry. That’s the promise of the Internet of Supply Chains (IoSC).

View More

© TraceLink Inc. 2009 - 2025 All Rights Reserved



Customer Update Highlights: Introducing the Platform for the Internet of Supply Chains

Watch the highlights from our recent customer update featuring TraceLink President & CEO Shabbir Dahod.

View More

© TraceLink Inc. 2009 - 2025 All Rights Reserved